

**Title: DISC APPARATUS WITH DEVICE FOR PREVENTING EJECTION
OF A CRACKED DISC**

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[0001] This application claims priority of Taiwan Patent Application No. 091113858 filed on June 25, 2002.

Field of Invention

[0002] The present invention relates to an apparatus for preventing a cracked disc from flying out of a disc data reading apparatus and a disc data reading device including the apparatus.

Background of the Invention

[0003] In past few years, the rotation speed of disc data reading apparatuses has rapidly increased. However, because of the unstable qualities of re-writable discs and increased rotation speed, the discs are easier to crack during rotation. In addition, accidents caused by ejected cracked discs have also rapidly increased. Hence how to prevent the cracked discs flying out of the disc data reading apparatuses is important when designing the structure of the disc data reading apparatuses.

[0004] Generally, the ejected cracked discs pass through a chink between the tray and the housing and damage the panel and cover. Conventionally, the front edge of the housing is bent downward to block the cracked discs. However, the energy generated while the discs crack usually presses the tray down, and then the cracked discs are able to pass from the underside of the front edge of the housing.

[0005] To solve this problem, some support points are disposed under the tray. While the energy forces the tray downward, the support points touch the chassis and receive a reaction force for limiting the downward displacement of the tray.

[0006] However, besides the tray, the energy also forces the housing upward. Therefore the problem of ejected cracked discs still exists.

Summary of the Invention

[0007] It is an aspect of the present invention to provide an apparatus for use with a disc data reading apparatus and preventing a cracked disc from flying out of the apparatus.

[0008] It is another aspect of the present invention to limit the displacement of the housing while the disc cracks.

[0009] It is another aspect of the present invention to limit the displacement of the tray while the disc cracks.

[0010] The present invention provides an apparatus for use with a disc data reading apparatus. In the first embodiment, the apparatus of the present invention includes a housing and a panel. The panel selectively connects with the housing. The housing has a protrusion, which connects with a front edge of the housing. The panel has a first surface corresponding to the protrusion. While the disc within the disc data reading apparatus cracks, a force existing between the protrusion and the first surface limits relative displacement of the panel and the housing for preventing a cracked disc flying out.

[0011] In addition, the housing includes a stopper for blocking the cracked disc. The stopper extends downward from the front edge of the housing.

[0012] The present invention further includes a tray and a chassis. The tray includes at least one support point. As the disc becomes cracked, the support point touches against the

chassis and receives a reaction force limiting relative displacement between the tray and the chassis.

[0013] In the second embodiment, differing from the first embodiment, an inner side edge of the panel connects the protrusion, and the housing has the first surface corresponding to the protrusion.

[0014] The present invention further provides a disc data reading apparatus using the apparatus mentioned above.

[0015] This and other aspects of the present invention will become clear to those of ordinary skills in the art after having read the following detailed description of the preferred embodiments illustrated in the various figures and drawings.

Brief Description of the Drawings

[0016] Fig. 1 shows a perspective view of the disc data reading apparatus;

[0017] Fig. 2a shows a front view of the first embodiment of the present invention;

[0018] Fig. 2b shows a cross-section profile of the embodiment of Fig. 2a taken along line I-I';

[0019] Fig. 2c shows a magnification view of a portion of the profile illustrated in Fig. 2b;

[0020] Fig. 3 shows the housing in accordance with a first embodiment;

[0021] Fig. 4a shows a bottom view of the tray;

[0022] Fig. 4b shows a perspective view of the chassis;

[0023] Fig. 5a shows a side view of the first embodiment;

[0024] Fig. 5b shows a profile taken along line II-II' of Fig. 5a; and

[0025] Fig. 6 shows a second embodiment of the present invention.

Detailed Description

[0026] The present invention provides an apparatus for use with a disc data reading apparatus 100 shown in Fig. 1. The apparatus of the present invention prevents a cracked disc from flying out when a disc within the disc data reading apparatus 100 cracks. The disc data reading apparatus 100 mentioned here may include a CD-ROM, a CD-R, a CD-RW, a DVD player, or other resemblances. The following description discloses several preferred embodiments of the present invention.

[0027] **First embodiment**

[0028] The description hereafter refers to Fig. 2a, Fig. 2b, and Fig. 2c. The apparatus of the present invention includes a housing 200 and a panel 300. The housing 200 has a protrusion 400, which connects with a front edge 220 of the housing 200. The protrusion 400 may have a slab shape, a spherical shape, a half-spherical shape, or other resemblances. In the embodiment illustrated in Fig. 2c, the protrusion 400 extends downward from the front edge 220 for a first interval 420, and then turns toward the panel 300. In other words, the protrusion 400 has an L-shaped profile. However, in other embodiments, the protrusion 400 may extend from the edge 220 and directly toward the panel 300. In addition, the protrusion 400 horizontally extend toward the panel 300; however, in other embodiments, the protrusion 400 may extend along an inclination.

[0029] The panel 300 selectively connects with the front edge 220 of the housing 200. In this embodiment, the panel 300 is removably connected with the front edge 220. The panel 300 includes a first surface 520 corresponding to the protrusion 400. Particularly, the first surface 520 corresponds to and contacts a side of the protrusion 400 when the housing 200 connects the panel 300. When a disc within the disc data reading apparatus 100 cracks, the concurrently generated energy forces the housing 200 and a tray 600 oppositely move or deform. The stopper 240 blocks most of the cracked pieces, and the other pieces fly toward

the panel 300 through a chink 440 formed by the stopper 240 and the tray 600. Those escaped pieces then force the panel 300 to move upward and the cover 800 to move downward so as to broaden the seam between the panel 300 and the cover 800. When the panel 300 and the cover 800 oppositely move, the first surface 520 contacts with the protrusion 400. The contact generates a force to limit relative displacement between the panel 300 and the cover 800 for preventing the cracked pieces flying out. In addition, an extension 522 of the first surface 520 overlaps the cover 800 with a specific interval X, and a chink 803, which is smaller than X, is between the cover 800 and the panel 300. While the cover 800 moves downward and contacts with the panel 300 to eliminate the chink 803, the extension 522 still overlaps the cover 800 to block the cracked pieces.

[0030] As Fig. 2c shows, the panel 300 further has a depression 500. In this embodiment, the depression 500 is a slot, which is parallel with the surface of the disc. The first surface 520 is a sidewall of the depression 500. When the housing 200 connects with the panel 300, the depression 500 receives the protrusion 400, and the sidewall of the depression 500, i.e. the first surface 520, corresponds to a side of the protrusion 400.

[0031] As Fig. 3 shows, the stopper 240 connects with the front edge 220 of the housing 200 and extends downward. The stopper 240 mentioned above may include a plate structure, a net structure, or other similar structures. In this embodiment, the stopper 240 is a plate structure and aligned with the protrusion 400 alternately.

[0032] As Fig. 4a, Fig. 4b, Fig. 5a and Fig. 5b show, the present invention further includes a tray 600 for holding the disc and a chassis 700 for supporting the tray 600. The tray 600 has at least one support point 620. The support point 620 mentioned above may include various kinds of appearances, such as sphere, half-sphere, cross, or other resemblances. As the disc becomes cracked, the support point 620 touches against the chassis 700 and receives a reaction force limiting relative displacement between the tray 600 and the chassis 700. In

other embodiments, however, the support point 620 may be arranged on the chassis 700 and touch against the tray 600. Moreover, the support points 620 may be arranged both on the tray 600 and the chassis 700 and contact with each other to provide a reaction.

[0033] Second Embodiment

[0034] As Fig. 6 shows, the difference between the first and the second embodiments is that the panel 300 has a protrusion 400 and the housing 200 has the first surface 540 corresponding to the protrusion 400. The protrusion 400 extends from a side edge 320 of the panel 300. The protrusion 400 may have a slab shape, a spherical shape, a half-spherical shape, or other resemblances. As Fig. 6 shows, the protrusion 400 extends from the side edge 320 and toward the housing 200. In addition, the protrusion 400 horizontally extend toward the panel 300, however, in another embodiments, the protrusion 400 may extend along an inclination.

[0035] The housing 200 selectively connects with the side edge 320 of the panel 300. In this embodiment, the housing 200 is removably connected with the side edge 320. The first surface 540 corresponds to and contact with a side surface of the protrusion 400 when the housing 200 connects with the panel 300. When a disc within the disc data reading apparatus 100 cracks, the concurrently generated energy forces the housing 200 and a tray 600 respectively move or deform in opposite directions. In the meantime, the first surface 540 contacts with the protrusion 400. The contact generates a force to limit relative displacement between the panel 300 and the housing 200 for preventing the cracked pieces from flying out.

[0036] As Fig. 6 shows, the housing 200 further has a depression 500. In this embodiment, the depression 500 is a slot, which is parallel with the surface of the disc. The first surface 540 is a sidewall of the depression 500. When the housing 200 connects with

the panel 300, the depression 500 receives the protrusion 400, and the sidewall of the depression 500, i.e. the first surface 540, corresponds to a side surface of the protrusion 400.

[0037] Those skilled in the art will readily observe that numerous modifications and alterations of the device may be made within the teaching of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.